Foraging Behavior of Honey Bees on Selected Alfalfa Clones

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The efficiency of various tests utilized to determine combining ability of alfalfa clones is directly related to randomness of pollination in seed production nurseries. It is generally recognized that alfalfa seed production depends primarily on tripping and cross-fertilization by bees. Honey bees are the most numerous and most important pollinators, except in limited areas of the United States. There are many references to honey bees having shown preferences among fruit crop varieties and considerable work has shown that bees may forage over a variable area. Data are also available regarding the placement of colonies of honey bees for field pollination of various field crops but information regarding individual bee activity is meager.

This study was initiated to determine the exact foraging pattern of individual honey bees and to relate these patterns to randomness of pollination.

REVIEW OF LITERATURE

Butler et al. (3) set up syrup feeding stations and observed that honey bees usually returned to the same source from which they had previously fed. Butler (2) marked honey bees working on a 5- by 8-yard "patch" of Fireweed or Great Willow Herb (Epilobium angustifolium L.) flowers in a large field of willow herb and later found most of his bees working either in the same "patch" or very close to it. He concluded that bees exercised a fixation for an area. Singh (15) found that marked honey bees usually confined their visits to rather limited areas of the crop worked, but that this area could be rather elastic due to conditions which influenced the amount of bee forage in an area. Butler (2) also noted that 99% of honey bees confine their attention to one species on any one foraging expedition. Bateman (1) reported that honey bees showed a high but incomplete constancy to Brassica species within single foraging trips and a lower but highly significant constancy to intercrosses between species. Van Emden and Monners (17) concurred with the idea of species specificity, but stated that it would be rather "far fetched" to speak of an absolute flower constancy by honey bees. McGregor et al. (7) observed "a marvel in the constancy of the honey bee in foraging the same limited area." One bee made 21 complete foraging trips to 7 flowers on 1 arm of a saguaro cactus. Of these 21 trips, 5 consecutive trips were made to the same flower.

Differences in attractiveness of clonal lines of alfalfa have been noted for various pollinators. Pedersen and Bohart (9) and Vansell and Todd (18) reported preferences by bumble bees and by Megachile and Nomia bees, respectively. Vansell and Todd (18) indicated by suggestion that no clonal preferences had been observed for honey bees at that time. Pedersen and Todd (11) found inherent differences in the abilities of alfalfa plants to attract honey bees. Pedersen (8) found that bee activity was correlated with nectar production and that nectar production might be inherited on a multifactorial basis. He was unable to explain seed yield in terms of observed bee visitation and concluded that there probably was an inherent difference in plant response to bee visitation.

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